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EXAMINER

AGUSTIN, PETER VINCENT

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/988,788	Applicant(s) SHIONO ET AL.	
	Examiner Peter Vincent Agustin	Art Unit 2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-16 and 30 is/are allowed.
- 6) ☒ Claim(s) 17-29 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 17, 22, 24, 25, 29 & 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawada et al. (JP 06-028672) (see translation).

In regard to claim 17, Kawada et al. disclose an optical information recording and reproducing apparatus (see Drawing in front cover) for recording information bits into an information recording medium having a recording member (5) into which information bits are recorded in a three-dimensional arrangement by changing a refractive index of the recording member of the recording medium (see constitution), the apparatus comprising: a light source (2) that emits a light beam; an objective lens (3) that converges the light beam emitted from the light source to an information recording medium; and a light detector (7) that detects a light beam from the information recording medium, wherein a thickness of the recording member is larger than a wavelength of the light beam (see paragraph 22), wherein an amount of the change in refractive index is less than or equal to 0.02 (see paragraph 13 of the translated document in light of paragraph 13 of the Japanese document, which teaches that a refractive index change is $1 \mu\text{m}^3$, which is equal to $1 \times 10^{-6} \text{ m}$ or 0.000001), and wherein the information bits are recorded sequentially into the recording member in a three-dimensional arrangement such that the number of rows of information bits which have been already recorded in the direction of optical axis is

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not more than 4 (see element 5 on the front cover of the Japanese document, which shows 4 rows of information bits).

In regard to claim 22, Kawada et al. disclose that the wavelength λ of the light beam emitted from the light source substantially is in a range satisfying $0.35 \mu\text{m} \leq \lambda \leq 0.45 \mu\text{m}$ (see paragraph 13, which teaches a wavelength of 500 nm or 0.5 μm , which is “substantially” equal to the upper limit of the claimed range), and the optical system including the objective lens is configured to be achromatic (note “dichromated gelatin” in paragraph 14; see also Kuba (US 5,661,604), column 10, lines 29-34).

In regard to claim 24, Kawada et al. disclose that the information recording medium comprises one and only one recording member (as shown in the front cover).

In regard to claim 25, Kawada et al. disclose that the information recording medium comprises the recording member (5) and a substrate (not shown but inherent). The claimed “substrate” is read to correspond to an inherent layer to which the recording member is attached. The recording medium comprises a transparent element (the recording member 5) which allows light to pass through one side; and it also comprises an element which allows the light to be reflected (the inherent substrate). Without the substrate, all of the light would be transmitted through the other side, and the light detector (7) would not have any reflected light to receive. Therefore, the information recording medium of Kawada et al. necessarily comprises a substrate.

In regard to claim 29, Kawada et al. disclose that a focus position (note “condensing point” on paragraph 24) of the objective lens is controlled with reference to an interface of the recording member of the recording medium. The claimed “interface” is read to correspond to any point within recording member 5 where focusing is performed.

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In regard to claim 31, Kawada et al. disclose that the recording member is a single recording layer (as shown in the front cover).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al.

For a description of Kawada et al., see the rejection above. Furthermore, in regard to claim 18, Kawada et al. disclose that the objective lens comprises a lens of which numerical aperture is high (see paragraph 13), and pinholes are disposed in an optical path including the objective lens and the light detector such that the light beam from the information recording medium is detected by the light detector after passing through the pinholes (see paragraph 21). However, in regard to claim 18, Kawada et al. are silent to whether the numerical aperture is more than or equal to 0.7, as claimed.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have provided an objective lens having a numerical aperture more than or equal to 0.7, as claimed, because the applicant's invention would have been expected to perform equally well with either the arbitrary "high numerical aperture" taught by Kawada et al. or the claimed numerical aperture more than or equal to 0.7 since either one of these numerical apertures would have provided the same advantage of obtaining higher recording density (see

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paragraph 13), and therefore, choosing either values/ranges would have been an obvious expedient.

5. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al. in view of Takahashi (US 5,748,601).

For a description of Kawada et al., see the rejection above. Furthermore, Kawada et al. disclose: in regard to claims 19 & 21, a pinhole array having a plurality of pinholes and disposed in the optical path (see paragraph 21).

However, Kawada et al. do not disclose: in regard to claim 19, a focus/track error signal detecting optical element which is an optical splitting element and disposed in an optical path including the objective lens and the light detector, wherein the light beam from the information recording medium is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and the plurality of light beams are detected by the light detector after passing through corresponding pinholes of the pinhole array; in regard to claim 20, a focus/track error signal detecting optical element disposed in an optical path including the objective lens and the light detector, wherein the light beam from the information recording medium is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and each split light beam is detected by the light detector having an area smaller than that of each of the split light beams; and in regard to claim 21, a focus/track error signal detecting optical element disposed in an optical path including the objective lens and the light detector, wherein the light beam from the information recording medium is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and the light beams

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corresponding to track error signals are detected by the light detector after passing through pinholes of the pinhole array.

Takahashi discloses: in regard to claim 19, a focus/track error signal detecting optical element which is an optical splitting element (Figure 2, elements 12 & 13; note elements 17 & 18) and disposed in an optical path including an objective lens (14) and a light detector (16), wherein a light beam from an information recording medium (20) is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and the plurality of light beams are detected by the light detector after passing through corresponding pinholes of a pinhole array (15); in regard to claim 20, a focus/track error signal detecting optical element (Figure 2, elements 12 & 13; note elements 17 & 18) disposed in an optical path including an objective lens (14) and a light detector (16), wherein a light beam from an information recording medium (20) is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and each split light beam is detected by a light detector (portion of element 16 where one of the split light beams is converged) having an area smaller than that of each of the split light beams (note that a split light beam is "converged" into a portion of element 16, i.e., a portion having a smaller area than the split light beam); and in regard to claim 21, a focus/track error signal detecting optical element (Figure 2, elements 12 & 13; note elements 17 & 18) disposed in an optical path including an objective lens and a light detector, wherein a light beam from an information recording medium (20) is split into a plurality of light beams by means of the focus/track error signal detecting optical element, and the light beams corresponding to track error signals are detected by the light detector after passing through pinholes of a pinhole array (15).

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It would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have added the focus/track error signal detecting optical element of Takahashi to the apparatus of Kawada et al., the motivation being to prevent degradation of the sensitivity of detection of the optical spot used for detecting tracking/focusing error signals (see column 2, lines 18-24 & 27-33).

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al. in view of Hesselink et al. (US 6,212,148).

For a description of Kawada et al., see the rejection above. However, in regard to claim 23, Kawada et al. do not disclose a spherical aberration correcting element disposed in an optical path including the light source and the objective lens, wherein the spherical aberration correcting element controls an amount of spherical aberration in accordance with a recording depth of the information bits to be recorded into the recording member.

Hesselink et al. disclose a spherical aberration correcting element (Figure 2-C, element 39) disposed in an optical path including a light source (134) and an objective lens (48), wherein the spherical aberration correcting element controls an amount of spherical aberration in accordance with a recording depth of information bits to be recorded into a recording member of an optical disk (column 4, lines 39-49). It would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have added the spherical aberration correcting element of Hesselink et al. to the apparatus of Kawada et al., the motivation being to minimize reproduction errors caused by spherical aberration.

7. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al. in view of Yamada et al. (US 5,080,947).

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For a description of Kawada et al., see the rejection above. Furthermore, in regard to claim 26, Kawada et al. disclose that the information recording medium comprises a recording member (5) and a substrate (inherent as noted on claim 25 rejection above). However, in regard to claim 26, Kawada et al. are silent to whether the information recording medium is configured by the recording member sandwiched between a substrate and a protecting member.

Yamada et al. disclose an information recording medium (Figure 1) having a recording member (2) sandwiched between a substrate (1) and a protecting member (layers labeled 3 & 4 on top of recording member 2). It is well-known in the art that recording media are provided with protective layers in order to prevent scratches and to keep dust from entering the recording layer. It would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have added the protecting member of Yamada et al. to the information recording medium of Kawada et al., the motivation being to prevent scratches and to keep dust from entering the recording member, thereby preventing erroneous reproduction of information.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al. in view of Durham (US 5,532,998).

For a description of Kawada et al., see the rejection above. However, in regard to claim 27, Kawada et al. do not explicitly disclose that the light detector comprises an avalanche photodiode.

Durham discloses a light detector comprising an avalanche photodiode (column 14, lines 9-12), which is known in the art to provide greater sensitivity. It would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have provided the

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avalanche photodiode of Durham to the light detector of Kawada et al., the motivation being to provide greater sensitivity, thereby ensuring a more accurate reproduction.

9. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawada et al. in view of Ishii et al. (US 4,125,860).

For a description of Kawada et al., see the rejection above. However, in regard to claim 28, Kawada et al. do not disclose a condenser lens disposed on one side of the information recording medium opposite to the objective lens, the condenser lens converging the light beam from the information recording medium to the light detector to detect the light beam.

Ishii et al. disclose a condenser lens (Figure 5, element 33) disposed on one side of an information recording medium (20) opposite to an objective lens (32), the condenser lens converging a light beam from the information recording medium to a light detector (34) to detect the light beam. It would have been obvious to one of ordinary skill in the art at the time of the invention by the applicant to have added the condenser lens of Ishii et al. to the apparatus of Kawada et al., the motivation being to provide an apparatus capable of reproducing with high efficiency without being accompanied by an increase in size or cost of the apparatus (column 2, lines 38-46).

Allowable Subject Matter

10. Claims 1-16 & 30 are allowed over the prior art of record.

11. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record alone or in combination fails to teach or suggest as a whole:

In independent claim 1, an optical information recording and reproducing apparatus for recording information bits into an information recording medium having a recording member

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into which information bits are recorded in a three-dimensional arrangement by changing an optical constant of the recording member of the recording medium, the apparatus comprising: a light source that emits a light beam; an objective lens that converges the light beam emitted from the light source to the information recording medium; and a light detector that detects the light beam from the information recording medium, wherein a thickness of the recording member is larger than a wavelength of the light beam, and the information bits are sequentially recorded into the recording member in a three-dimensional arrangement such that a converging light beam from the objective lens does not pass through information bits that have already been recorded.

In regard to independent claim 1, the closest prior art, Kawada et al. (JP 06-028672), discloses all the claimed elements with the exception of “the information bits are sequentially recorded into the recording member in a three-dimensional arrangement such that a converging light beam from the objective lens does not pass through information bits that have already been recorded”. Another prior art, Wierenga (US 6,552,985) discloses a multi-layer recording medium where information is recorded sequentially starting from the recording layer farthest from a laser light source to the recording layer closest to the laser light source. However, it would not have been obvious to combine the teachings of Kawada et al. and Wierenga to arrive at the claimed invention because the recording technique of Wierenga is directed to a recording medium having multiple layers, while Kawada et al. teaches of a single recording member having a three-dimensional arrangement of information bits.

Claims 2-16 & 30 are dependent upon claim 1.

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Response to Arguments

12. Applicant's arguments filed December 13, 2004 have been fully considered but are moot in view of the indicated allowable subject matter and the new ground(s) of rejection.

13. This action is NON-FINAL.


Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Vincent Agustin whose telephone number is 571-272-7567. The examiner can normally be reached on Monday-Friday 9:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Thi Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter Vincent Agustin
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BRIAN E. MILLER
PRIMARY EXAMINER